Study on Relationship between Regional Environment, High-Tech Zones Entrepreneurship and Regional Economic Growth: A Perspective of Direct Effect and Moderating Effect

Liang Fang

School of Economics and Management, Huangshan University, Huangshan, China

Keywords: National High-Tech Zones, Entrepreneurship, Regional Economic Growth, SEM, CFA.

Abstract: In order to explore the relationship between regional environment, entrepreneurship in national high-tech zones and regional economic growth, the paper analyzes that national high-tech zones entrepreneurship's direct effect on regional economic growth and moderating effect of economic environment, cultural environment, political environment, open environment and infrastructures by confirmatory factor analysis and structural equation moderating effect analysis by the method of CFA Analysis and SEM Analysis, the concludes is that national high-tech zones entrepreneurship promotes regional economy growth significantly, and cultural environment, political environment, open environment and infrastructures have significant moderating effect, then the paper puts forward suggestions: strengthen high-tech zones entrepreneurship management, strengthen cultural environment construction, strengthen support for entrepreneurship, create an open business environment, improve infrastructures and so on.

1   INTRODUCTION

In the past few decades, the economic situation has experienced severe tests such as oil crisis, debt crisis, financial crisis and inflation. However, this has given birth to entrepreneurial activities all over the world, and entrepreneurship has become a beautiful landscape under the economic wave. Entrepreneurship has become an engine to promote the growth of business sectors and the rapid expansion of social sectors. In China, entrepreneurial activities are active. Entrepreneurs has increased year by year since 2000, the total number of entrepreneurs ranked first in the world by 2014. The high-tech industry has developed rapidly. The number of entrepreneurs and entrepreneurial service institutions is increasing day by day, and new enterprises emerge one after another. Entrepreneurship has become a powerful driving force to promote regional economic growth. The emergence of entrepreneurial activities is not only a sign of economic development, but also an important force to promote economic development, Guiso and schivardi (2011) believed that lower entry costs, the external effects were higher, the entrepreneurship rate was higher, and the impact on the regional economy was greater.

Therefore, a high entrepreneurship rate was more conducive to promoting the growth of the regional economy. Moreover, entrepreneurship was closely related to employment. Lumpkin et al.(2009) believed entrepreneurial output was also conducive to promoting economic growth.

Many researchers also believe that entrepreneurial behavior occurs in a certain social environment and is inevitably affected by the external environment, such as economic environment, tax system and market competition, which have an important impact on entrepreneurship. So the research on entrepreneurship should be incorporated into the overall framework of the environment for exploration. Timmons et al. put forward the influence and regulation of economic environment on entrepreneurship, the economic effect of entrepreneurship is closely related to environmental factors such as government support and financial investment. The success rate of entrepreneurship is higher in areas with strong cultural atmosphere.

Minguzzi and Passaro(2001) pointed out that entrepreneurs in areas with backward cultural level often showed avoidance and resistance to entrepreneurship.

However, so far, there are few studies on the

impact of entrepreneurship in national high-tech zones on regional economic growth, especially the relevant empirical research results are very underdeveloped. Entrepreneurship is an important economic activity of the national high-tech zones. In fact, entrepreneurship plays a positive role not only in the economic output of the high-tech zonse, but also in regional economic growth. Moreover, the process of entrepreneurship affecting regional economic growth will be moderated by the regional environment, and the unused environmental conditions will have different effects. Therefore, this study will analyze the impact of entrepreneurship in national high-tech zones on regional economic growth and moderating effect of different regional environments.

2 INDEX DESIGN

Regional environment is important external condition and influencing factor of entrepreneurship. The environment affects every link of entrepreneurship. How to adapt to and make use of the regional environment is important for entrepreneurship. The entrepreneurial environment mainly includes politics, economy, population, culture, globalization and so on. This study measures the regional environment and moderating effect of the regional environment based on the content of this environmental dimension theory.

The variables and indexes are shown in Table 1.

Table 1: Index System.

Variables	Index and Codes
Entrepreneurship（EA）	Total Income of National Incubators in National High-tech Zones (1000 yuan) (EA1); Number of Incubated Enterprises in National High-tech Zone National Science and Technology Enterprise Incubator (persons) (EA2); Number of National Science and Technology Plan Projects Undertaken by Incubated Enterprises of National High-tech Zone National Science and Technology Enterprise Incubators (EA3); Total Number of Personnel of National Demonstration Productivity Promotion Center of National High-tech Zone (persons) (EA4); Government Investment of National Demonstration Productivity Promotion Center of National High-tech Zone (1000 yuan) (EA5)
Regional Economic Growth (RE)	Per Capita GDP of the City where the High-tech Zone is Located (100 million yuan) (RE)
Economic Environment (JJHJ)	Total Amount of Venture Capital Received by Incubating Enterprises per Capita in High-tech Zone (1000 yuan per person) (EE1); Added Value of Secondary Production per Capita (yuan per person) (EE2); Per Capita Disposable Income of Urban Residents (yuan) (EE3); Per Capita Net Income of Rural Residents (yuan) (EE4)
Cultural Environment (WHHJ)	Proportion of Personnel with College Degree or Above in Total Employment in National High-tech Zones (EE5)
Political Environment (ZZHJ)	Per capita Financial Expenditure (yuan per person) (EE6); Annual per Capita Investment in Fixed Assets of the Whole Society (yuan per person) (EE7); Investment Amount of Government Public Technology Service Platform Obtained by Enterprises in High-tech Zones per Capita (1000 yuan per person) (EE8)
Open Environment (KFHJ)	Proportion of Total Import and Export to GDP (EE9)
Infrastructures (JCSS)	Highway Passenger Turnover (100 million person kilometers) (EE10); Per Capita Total Income of Communication Business (10000 yuan per person) (EE11); Incubator Area per Capita in National High-tech Zones (square meters per person) (EE12)

The data of the index mainly comes from the statistical yearbook of China torch, region science and technology yearbooks, region high-tech industry development yearbooks, region statistical bulletin of national economic and social development, and statistical data obtained from market survey conducted by national high-tech zones. Some missing data is supplemented by interpolation.

3 EMPIRICAL ANALYSIS

3.1 CFA Analysis of Structural Equation

CFA analysis is performed by amos20.0, parameter estimates and model suitability indicators are shown in Table 2. All index standardization coefficients are greater than 0.5, $X^2/DF \leq 3$, GFI > 0.9, AGFI > 0.9, RMSEA < 0.08.

Table 2: Summary of CFA.

Variables	Index	Model Parameter Estimation			Model Matching Index				Convergence Validity			
		Non-SFL	t	P	X²/DF	GFI	AGFI	e	SFL	SMC	CR	AVE
Entrepreneurship	EA1	1			1.815	0.967	0.901	0.089	0.96	0.922	0.939	0.757
	EA2	0.150	23.054	***					0.96	0.922		
	EA3	0.000	14.925	***					0.86	0.740		
	EA4	0.001	11.669	***					0.78	0.608		
	EA5	0.214	11.223	***					0.77	0.593		
Economic Environment	EE1	1			0.328	0.997	0.984	0.000	0.49	0.240	0.822	0.545
	EE2	75430.6	4.708	***					0.77	0.593		
	EE3	21773.5	4.776	***					0.80	0.640		
	EE4	20338.2	4.840	***					0.84	0.706		
Political Environment	EE6	1			—	1	—	—	0.88	0.774	0.762	0.523
	EE7	3.170	4.649	***					0.61	0.372		
	EE8	0.000	4.766	***					0.65	0.423		
Infrastructures	EE10	1			—	1	—	—	0.91	0.828	0.821	0.608
	EE11	0.001	6.296	***					0.67	0.449		
	EE12	0.006	6.698	***					0.74	0.548		

Note: * * * stands for P<0.001.

3.2 Reliability Analysis

The index of Entrepreneurship, Economic Environment, Political Environment and Infrastructures are tested for composition reliability and convergence validity. According to the condition of CFA Analysis, Convergence validity ($CR \geq 0.7$), the formula of CR is as follows:

$$CR = \frac{(\sum \beta_i)^2}{(\sum \beta_i)^2 + \sum e_i} \qquad (1)$$

β_i is standardization factor loading(SFL), e_i is error of index, the formula of Average variation extraction (AVE≥0.36)is as follows:

$$AVE = \frac{(\sum \beta'_i)^2}{(\sum \beta'_i)^2 + \sum e_i} \qquad (2)$$

β_i' is non-standardization factor loading(non-SFL), e_i is error of index, the results are shown in Table 2. The values of CR and AVE meet the CFA condition, the indexes have good reliability and convergence effect.

3.3 Descriptive Statistical Analysis

The results of descriptive statistical analysis of variables are shown in Table3. It can be seen that there is a significant positive correlation between the indexes of entrepreneurship, also there is a significant positive correlation between the indexes of entrepreneurship and regional economic growth.

Table 3: Descriptive Statistical Analysis.

Index	Mean	SD	EA1	EA2	EA3	EA4	EA5	RE
EA1	40912.08	71647.55	1					
EA2	8062.10	10673.82	0.921**	1				
EA3	14.35	32.76	0.837**	0.821**	1			
EA4	51.90	53.25	0.730**	0.772**	0.690**	1		
EA5	10251.72	19165.22	0.746**	0.749**	0.621**	0.536**	1	
RE	59419.32	27753.60	0.433**	0.459**	0.235*	0.258**	0.398**	1

Note: * * represents significant correlation at 0.01 level, * represents significant correlation at 0.05 level.

3.4 Direct Effect of Entrepreneurship on Regional Economic Growth

The analysis results are shown in Figure 1 and table 4. The standardized regression coefficient of entrepreneurship on regional economic growth is 0.44, t is 4.912, $p < 0.001$, SD is 0.037, the value of entrepreneurship index meets the model conditions, and the model fitness meets the SEM conditions. This shows that entrepreneurship has a very significant impact on regional economic growth. Entrepreneurship in high-tech zones can positively promote regional economic growth, and the higher the entrepreneurship level of high-tech zones, the greater the growth of regional economy.
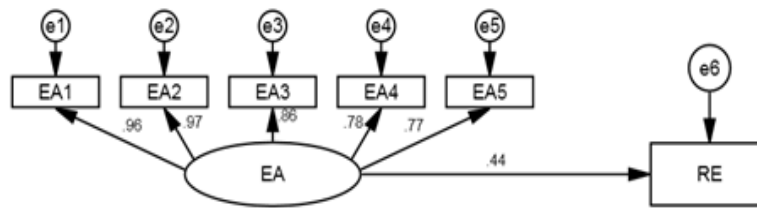
X^2=24.948 df=9; X^2/df=2.772; GFI=0.926; AGFI=0.828; RMSEA=0.131

Figure 1: Effect Model of Entrepreneurship on Regional Economic Growth.

Table 4: Regression Results of Entrepreneurship on Regional Economic Growth.

Index	Non standardized value	SD	T	P	X^2/df	GFI	AGFI	e
EA1←EA	1							
EA2←EA	0.151	0.006	23.326	***				
EA3←EA	0	0	14.688	***				
EA4←EA	0.001	0	11.62	***	2.772	0.926	0.828	0.131
EA5←EA	0.215	0.019	11.254	***				
RE←EA	0.18	0.037	4.912	***				

Note: * * * stands for P ≤ 0.001, * * stands for P ≤ 0.01, * stands for P ≤ 0.05.

3.5 Moderating Effect of Environment

3.5.1 Group Division

The moderating variables are divided into two groups: excellent group and inferior group according to the comprehensive factor score in order to explore the moderating effect of economic environment, cultural environment, political environment, open environment and infrastructures environment. The excellent group represents the group with larger value, and the inferior group represents the group with smaller value, then the differences between the two groups are compared. The division of index values are shown in Table5.

Table 5: Division Points of Regional Environment.

	Infrastructures	Economic Environment	Political Environment	Cultural Environment	Open Environment
Upper limit of inferior group	-0.1625	-0.4365	-0.3885	0.3991	0.0989
Lower limit of excellent group	-0.3073	0.2635	0.1913	0.4210	0.2882

3.5.2 Moderating Effect of Economic Environment

The analysis results of moderating effect of Economic Environment are shown in Figure 2 (1) and Figure 2 (2). Entrepreneurship regression coefficient on regional economic growth of excellent group is 0.18, The coefficient of inferior group is 0.02. The significance of moderating variables is tested, the results are shown in Table 6. p=0.38>0.1, It is considered that the Economic Environment does not play a significant moderating effect between entrepreneurship and regional economic growth in national high-tech zones.

3.5.3 Moderating Effect of Cultural Environment

The analysis results of Cultural Environment are shown in Figure3 (1) and Figure3 (2). Entrepreneurship regression coefficient on regional economic growth of excellent group is 0.48, the coefficient of inferior group is 0.14. It is considered that high-tech zones located in areas with better cultural environment are more conducive to entrepreneurship and promote regional economic growth. The significance of moderating variables is tested, the results are shown in Table 6. $p = 0.028 < 0.05$, it is considered that the Cultural Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth.

3.5.4 Moderating Effect of Political Environment

The analysis results of Political Environment are shown in Figure4 (1) and Figure4 (2). The regression coefficient of the excellent group is 0.34 and that of the inferior group is 0.06. It is believed that Entrepreneurship in high-tech zones with better political environment is more conducive to promoting regional economic growth. The test results are shown in Table 6, $p = 0.091 < 0.1$, it is considered that the Political Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth.

3.5.5 Moderating Effect of Open Environment

The analysis results of Open Environment are shown in Figure5 (1) and Figure5(2). The regression

coefficient of the excellent group was 0.42, and that of the inferior group is 0.08. The test results are shown in Table 6, $p = 0.034 < 0.05$, it is considered that Open Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth.

3.5.6 Moderating Effect of Infrastructures

The analysis results of Infrastructures are shown in Figure6 (1) and Figure6 (2). The regression coefficient of the excellent group was 0.51, and that of the inferior group is 0.02. The test results are shown in Table 6, $p = 0.036 < 0.05$, it is considered that Infrastructures in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth.
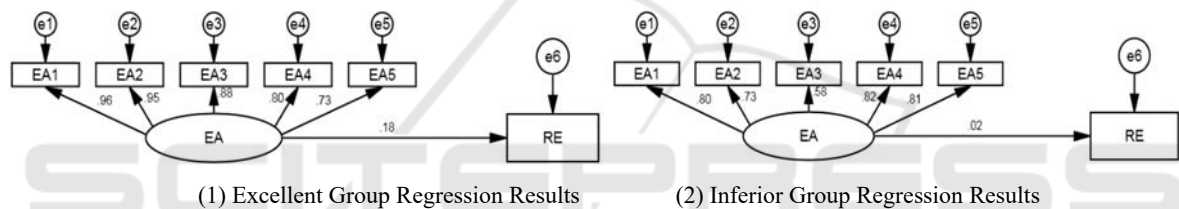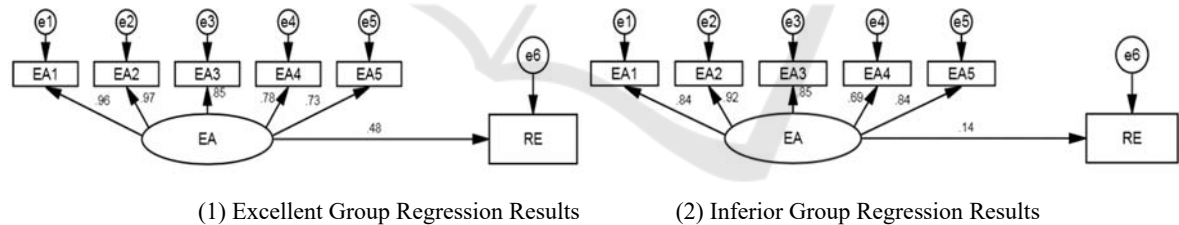

(1) Excellent Group Regression Results   (2) Inferior Group Regression Results

Figure 2: Moderating Effect of Economic Environment.

(1) Excellent Group Regression Results   (2) Inferior Group Regression Results

Figure 3: Moderating Effect of Cultural Environment.

(1) Excellent Group Regression Results   (2) Inferior Group Regression Results
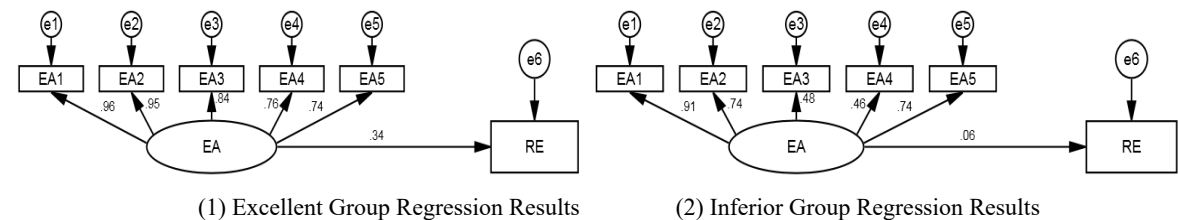
Figure 4: Moderating Effect of Political Environment.

(1) Excellent Group Regression Results   (2) Inferior Group Regression Results
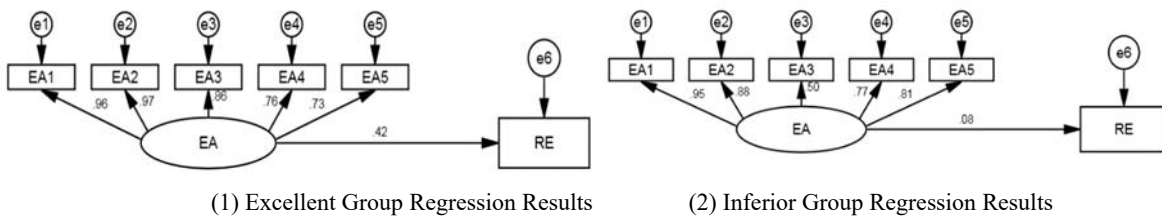
Figure 5: Moderating Effect of Open Environment.

(1) Excellent Group Regression Results   (2) Inferior Group Regression Results
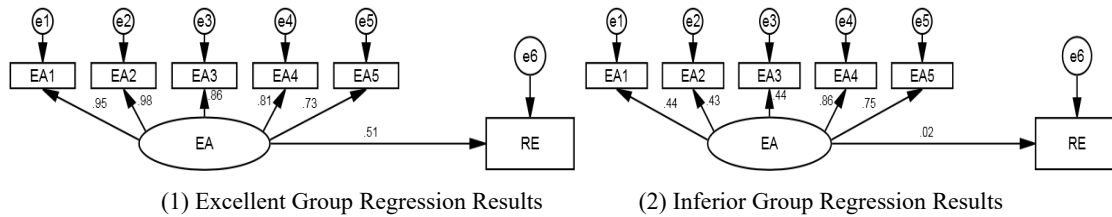
Figure 6: Moderating Effect of Infrastructures.

Table 6: the Significance of Moderating Variables.

Statistic	X^2	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Economic Environment	0.770	0.380	0.003	0.003	-0.008	-0.009
Cultural Environment	4.858	0.028	0.010	0.010	0.005	0.005
Political Environment	2.707	0.091	0.009	0.010	-0.005	-0.005
Open Environment	4.515	0.034	0.013	0.014	0.013	0.014
Infrastructures	4.409	0.036	0.013	0.013	0.003	0.004

4 CONCLUSIONS

ased on the current analysis and research results, this paper discusses the paper analyzed that national high-tech zones entrepreneurship's direct effect on regional economic growth and moderating effect of economic environment, cultural environment, political environment, open environment and infrastructures by confirmatory factor analysis and structural equation moderating effect. The following conclusions are drawn: (1) national high-tech zones entrepreneurship promotes regional economy growth significantly, (2) the Cultural Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth; (3) Political Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth; (4) Open Environment in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth; (5) Infrastructures in high-tech zones plays a significant moderating role between entrepreneurship and regional economic growth.

5 SUGGESTIONS AND COUNTERMEASURES

Strengthen entrepreneurship management in high-tech zones, encourage all kinds of entrepreneurial explorations and experimentations, encourage the entrepreneurial behaviors of large enterprises. The government and administrative departments should also support the development of incubators and support incubated enterprises and newly established small enterprises. Set up special funds for incubator development, strengthen the service function of the Productivity Promotion Center, develop the driving role of entrepreneurship in regional economic growth.

Strengthen the construction of entrepreneurial culture environment in high-tech zones, strengthen talents training and education, improve the entrepreneurial ability and quality of talents in high-tech zones, create entrepreneurial teams and learning organizations actively, and strengthen the performance managements of entrepreneurs. Local government departments should build education

platforms for entrepreneurial talents in high-tech zones, guide cooperation and exchanges between enterprises and education training institutions, and encourage cooperation of industries, universities and research institutions.

Strengthen support for entrepreneurship, especially entrepreneurial activities with good market prospects and great market value. Encourage the commercialization and marketization of entrepreneurial projects. Build special policies such as entrepreneurship fund and entrepreneurship support fund, expand entrepreneurship loans and financing channels, and implement entrepreneurship tax incentives to improve the performance of entrepreneurship effectively.

Create open entrepreneurial environment, increase regional openness, strengthen cross regional exchanges and cooperation, and encourage foreign investments in science and technology entrepreneurship.

Improve infrastructure conditions, improve the comprehensive transportation network, especially promote the constructions of entrepreneurship network, improve the constructions of information and communication facilities, and improve the service capacity of information facilities, especially in the central and western regions with relatively low economic development level.

ACKNOWLEDGMENT

REFERENCES

Austin J, Stevenson H, Wei-Skillern J. Social and Commercial Entrepreneurship: Same, Different, or Both?[J]. Entrepreneurship Theory and Practice, 2006, 30(1)

Yuli Zhang. A Review of Classical Literature on Entrepreneurship[M]. Tianjin: Nankai University Press, 2010

Guiso L, Schivardi F. What Determines Entrepreneurial Clusters?[J]. Journal of the European Economic Association, 2011, 9(1)

Lumpkin GT, Cogliser C C, Schneider D R. Understanding and Measuring Autonomy: An Entrepreneurial Orientation Perspective[J]. Entrepreneurship Theory & Practice, 2009, volume 33(1):47-69(23).

Qiong Qiu, Jian Gao. A Summary of Research Trends on the Relationship Between Entrepreneurship and Economic Growth [J]. Foreign economy and management, 2004, 26(1)

Song Lin. Entrepreneurship: Principle and Practice[M] .Shanghai: Shanghai University of Finance and Economics Press,2008

Shivani S, Mukherjee S K, Sharan R. Socio-cultural influences on Indian entrepreneurs: The need for appropriate structural interventions[J]. Journal of Asian Economics, 2006, 17(1)

Minguzzi A, Passaro R. The network of relationships between the economic environment and the entrepreneurial culture in small firms[J]. Journal of Business Venturing, 2001, 16(2): 181-207.

Xiaobo Wu, Weihua Zhou, Jian Du. Entrepreneurship Management [M]. Beijing: China Machine Press, 2011

Nicholls-Nixon C L, Cooper A C, Woo C Y. Strategic experimentation: understanding change and performance in new ventures [J]. Journal of Business Venturing, 2000, 15(5):493-521.